Remarks

The present application was filed December 21, 2001 with original claims 1-20. The first Office Action (Paper No. 8) mailed July 31, 2003 rejected claims 1-3, 9-13, 15 and 17, objected to claims 4-8, 14 and 16 and allowed claims 18-20.

The Applicant has provided certain amendments to the claims above, including amendments to the language of claims 1, 8 and 9, and the canceling of claims 12-17 in favor of new claims 21-27.

The amendments to independent claim 1 generally include a change from the use of the language "within" to "selected from" to clarify the relationship between the recited first and second motor adjustment signals and the recited first and second dynamic ranges. That is, the "first dynamic range of motor adjustment signals" describes a population (range) of values from which the particular "first motor adjustment signal" is selected (hence, the first signal is "within" the first range). Support for this amendment is provided in the specification at page 3, lines 17-32; page 6, line 32 to page 7, line 7, line 9; page 8, lines 23-30; and the flow of FIG. 8.

The respective terms "within" and "selected from" are deemed to be equivalent in view of the stated context, but it is believed that the use of the phrase "selected from" makes this clearer and will serve to place the case in better condition for reconsideration. Accordingly, this amendment does not serve to limit the scope of the claim. Claim 1 has further been broadened by the deletion of an unnecessary limitation.

Dependent claim 8 has been amended to remove the inadvertent use of the term "spindle" in front of "motor." This was an inadvertent error. With this amendment,

dependent claim 10 should now clearly be viewed as depending from claim 1, not from claim 8 as suggested by the Examiner.

Dependent claim 19 has been amended to add a period "." to the end of the claim.

The newly added claims 21-27 are provided in substitution for cancelled claims 12-17 and are generally directed to an apparatus which controls the application of current to a motor. A multi-mode digital to analog converter (DAC) is recited in claim 21 as having multiple selectable modes that provide different ranges of output analog voltages in response to the same range of digital input values.

By way of illustration (and not limitation), the recited DAC in claim 21 is exemplified by the DAC 146 in FIG. 4. Such DAC might be an 8-bit DAC that has 256 separate input digital values (i.e., from 00000000 to 11111111). The DAC might also have four (4) selectable modes so that the output analog ranges can be selected to be 0 to 0.1 volts (mode 1), 0 to 0.2 volts (mode 2), 0 to 0.4 volts (mode 3) and 0 to 0.8 volts (mode 4). The output analog value for a given input value will vary depending on which mode is selected; for example, a mid-range input digital value of 128, or 01000000, will provide respective corresponding mid-range output voltages of about 0.05 volts while the DAC is operated in mode 1; 0.1 volts in mode 2; and so on.

As set forth by the language of new claim 21, the DAC is adjusted from a first mode to a second mode when the digital input value approaches one of the "rails" of the digital input range (i.e., using the example above, moves to within some interval close to 00000000 or 11111111). Thus, it is the magnitude of the digital value that leads to the modal adjustment of the DAC. Support for the language of claim 21 is found in the specification, *inter alia*, at page 6 line 32 to page 7, line 10, and the flow of FIG. 8.

The Applicant submits that the subject matter of new independent claim 21 corresponds to, and is broader than, cancelled independent claim 12. New dependent claims 22-25 generally correspond to originally filed dependent claims 15, 16, 10 and 11, respectively.

The foregoing amendments are believed to be proper, do not introduce new matter, are not provided for purposes of patentability and serve to place the application in proper condition for reconsideration. With the entering of these amendments, the status of the claims is as follows:

Claim	Status
1 (Amended)	Independent.
2 (Original)	Depends from claim 1.
3 (Original)	Depends from claim 2.
4 (Original)	Depends from claim 3.
5 (Original)	Depends from claim 1.
6 (Original)	Depends from claim 5.
7 (Original)	Depends from claim 6.
8 (Amended)	Depends from claim 1.
9 (Original)	Depends from claim 1.
10 (Original)	Depends from claim 1.
11 (Original)	Depends from claim 1.
18 (Original)	Independent.
19 (Amended)	Depends from claim 18.
20 (Original)	Depends from claim 19.
21 (New)	Independent.
22 (New)	Depends from claim 21.
23 (New)	Depends from claim 21.
24 (New)	Depends from claim 21.
25 (New)	Depends from claim 24.

Objection to Claim 8

The first Office Action objected to claim 8 due to the inclusion of the phrase "spindle motor" therein, as the term "spindle" did not have proper antecedent basis. Since

dependent claim 10 introduces the term "spindle motor," for purposes of examination the Examiner considered claim 8 as depending from claim 10.

As mentioned above, the use of the term "spindle" in claim 8 was an inadvertent error. The Applicant thanks the Examiner for pointing out this error and apologizes for any inconvenience this may have caused.

In response, the Applicant has hereinabove amended claim 8 to remove the use of the term "spindle" in front of "motor, " and requests reconsideration and withdrawal of the objection on this basis. Moreover, the Applicant submits that claim 8 properly depends from independent claim 1 and requests that the claim be viewed accordingly during reconsideration.

Rejection of Claims Under 35 U.S.C. §102(b)

The first Office Action rejected claims 1, 2, 9, 12 and 13 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,173,647 issued to Hashimoto (hereinafter "Hashimoto '647"). While the Applicant sincerely appreciates the level of detail and analysis provided by the Examiner in setting forth the reasons in support of the rejection, the rejection is nevertheless respectfully traversed, and will be discussed in view of the amendments to the claims presented above.

In the Office Action at page 2, last full paragraph, the Examiner stated that Hashimoto '647 discloses applying a first motor adjustment signal to a motor (VCM 1a). The Examiner identified this signal as the disclosed "real speed" variable "Vr."

Regardless whether this characterization may be viewed as correct, the Applicant respectfully traverses the Examiner's view that Hashimoto '647 further discloses the recited

"first dynamic range of motor adjustment signals," as claimed.

Hashimoto '647 generally discloses an apparatus and method for carrying out a seek in a data storage device to move a head 1b to a destination track. FIG. 9A is a graphical representation of different gain values "Gv" that are applied for different values of a variable "d" as the head 1b approaches, and settles upon, the track. The Gv gain values are described as "differential gain values" that are stored in and accessed from a gain table 6a of a main processing unit 6' (see col. 5, lines 35-38 and FIG. 7). The "d" value is a tracks-to-go count that decrements as each track boundary is crossed during the seek (d=0 when the destination track is reached; see col. 5, lines 13-16 and 57-60).

FIG. 9A, the flow of FIG. 8 and the associated text in col. 5 show that Hashimoto '647 applies different gain values Gv as the head reaches successively closer distances (i.e., at d=256 tracks, d=16 tracks, etc.) from the destination track in order to control the deceleration of the head 1b onto the destination track.

It seems clear that the gain values Gv cannot reasonably be construed to correspond to the "first dynamic range of motor adjustment signals" from which the "first motor adjustment signal" is selected from, as claimed by claim 1. The scalar value Gv is not the same as the real speed value Vr; rather, Gv is a scalar value that is combined with Vr during operation.

As stated above, the original language "within" in claim 1, in the Applicant's view, was adequate to show that the Examiner's characterization of Hashimoto '647 was misplaced. However, now that claim 1 uses the language "selected from," it is abundantly clear that the "selected from a first dynamic range of motor adjustment signals" limitation of claim 1 is not disclosed, taught or suggested by Hashimoto '647. Reconsideration of the

rejection of the claims under §102(b) is therefore requested on this basis.

Moreover, as stated above, claim 1 has further been amended to more clearly indicate that it is the relative magnitude of the "first motor adjustment signal" that determines when the "second dynamic range of motor adjustment signals" is selected. Thus, even if the Examiner's characterization of the Gv values in FIG. 9A were a reasonable construction of the recited "dynamic ranges of motor adjustment signals," which the Applicant respectfully traverses, the limitations of claim 1 are still not met because it is the external variable "d" (i.e., distance from the track) that causes the shifts to different modes (i.e., levels of applied Gv gain), *not* the particular magnitude of the first motor adjustment signal, as set forth by claim 1.

Accordingly, the Applicant requests reconsideration of the rejection of the claims under §102(b) on this basis as well.

Rejection of Claims Under 35 U.S.C. §103(a)

The first Office Action further rejected claims 3, 10, 11, 15 and 17 under 35 U.S.C. §103(a) as being obvious over Hashimoto '647, alone or in view of U.S. Patent No. 4,132,414 issued to Dinsdale (hereinafter "Dinsdale '414"). These rejections are respectfully traversed.

The foregoing discussion with regard to the deficiencies of Hashimoto '647 is believed to be applicable to the §103(a) rejection as well, and so such points will not be repeated here.

The Applicant further points out that the claimed subject matter presented herein generally provides a multi-mode DAC and a selection circuit that, in the context of motor

control, monitors whether the DAC is operating near at least one of the upper or lower ends of the DAC range for a given mode and automatically selects a new mode to improve resolution and or output margin. In this way, even in a steady state condition wherein the motor is operated at a nominally constant velocity, a change in resolution/margin can be automatically effected as needed to generally keep the DAC operating in a mid-range (please see the language of the claims for a full recitation of the limitations thereof).

The Applicant submits that neither Hashimoto '647 nor Dinsdale '414, alone, in combination, or in view of other art of record, teaches or suggests the claimed subject matter, much less recognizes the problems solved thereby. Accordingly, reconsideration of the rejection of the claims under §103(a) is respectfully requested on this basis as well.

Allowable Subject Matter

The first Office Action indicated that claims 18-20 were allowed and claims 4-8, 14 and 16 were allowable if rewritten into independent form. The Applicant gratefully acknowledges this indication of allowance/allowability by the Examiner.

Conclusion

This is intended to be a complete response to the first Office Action mailed July 31, 2003. The Applicant respectfully requests that the Examiner reconsider and allow all of the pending claims in the application.

The Examiner is invited to contact the below signed Attorney should any questions arise concerning this response.

Respectfully submitted,

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